

1 **REMARKS**

2 **Objections to the Specification:**

3 The title of the invention has been objected to because it is not descriptive.  
4 The Examiner has suggested a new title. The Applicants have amended the title as  
5 suggested by the Examiner.

6 The disclosure has been objected to because in paragraph [0005], line 4, the  
7 reference character "102" should be "104" (referring to the scanning device). The  
8 Applicants have amended the disclosure to make the appropriate correction as  
9 identified by the Examiner.

10 **Rejection of Claims Under 35 U.S.C. § 112:**

11 Claims 21-25 and 31-34 have been rejected under 35 U.S.C. 112, first  
12 paragraph, as failing to comply with the written description requirement. The  
13 Examiner states that the claims contain subject matter which was not described in  
14 the specification in such a way as to reasonably convey to one skilled in the relevant  
15 art that the inventors, at the time the application was filed, had possession of the  
16 claimed subject matter. The Examiner specifically points out that claim 21 contains  
17 the limitation, "solidifying the viscous liquid" and that this limitation is not supported  
18 by the originally-filed specification and that this limitation thus constitutes new matter.

19 The Applicants note that to satisfy the written description requirement, an  
20 applicant must convey with reasonable clarity to those skilled in the art that, as of the  
21 filing date sought, he or she was in possession of the invention, and that the  
22 invention, in that context, is whatever is now claimed. (MPEP 2163.01.)

23 In response to the Examiner's contention that the limitation, "solidifying the  
24 viscous liquid" is not supported by the originally-filed specification, the Applicants  
25 argue that when a method describes building a solid structure from ejected droplets  
of liquids (as in the Applicants' disclosure – see ¶ [0012] of Applicants' disclosure),  
those of ordinary skill in the art understand that the liquids would ultimately solidify in  
order to produce the structure.

Moreover, the Applicants point out that the originally filed specification  
provides numerous examples of solidifying liquids used in forming the structure.  
Specifically, the Applicants provide, as examples of solidifying liquids, UV setting  
resin (paragraph [0021]), thermoplastic resin subjected to heat treatment (paragraph

1 [0021]), and polymerization (paragraph [0023]). Further more, the Applicants explain  
2 in paragraph [0024] that liquefied materials can include those that are pre-liquefied  
3 by heating and other means, which implies that those materials will solidify  
4 when cooled.

5 In view of the above, the Applicants contend that the written description, as of  
6 the filing date sought, conveys with reasonable clarity to those skilled in the art that  
7 the Applicants were in possession of the invention as currently claimed in claim 21,  
8 and that the Applicants therefore have satisfied the written description requirement.

9 Accordingly, the Applicants respectfully request that the rejection of claim 21  
10 be withdrawn. Inasmuch as claims 22-25 and 31-34 depend from claim 21, the  
11 Applicants also request that the rejections of those claims be withdrawn.

12 Rejection of Claims Under 35 U.S.C. § 103:

13 As indicated in the Office action, all of the pending claims have been rejected  
14 under 35 U.S.C. 103(a) as being unpatentable over Ederer in view of various other  
15 references including Jang, Fink, Edie, and U.S Patent No. 6,939,489 to Mozner et al.

16 The Applicants note that only claims 1 and 21 are independent claims, while  
17 all other pending claims depend from either claim 1 or 21, respectively. Accordingly,  
18 the Applicants initially address in detail, herein below, the rejections of claims 1  
19 and 21.

20 The Examiner contends that claim 1 is unpatentable over Ederer in  
21 combination with Mozner because Ederer teaches a process of making a three-  
22 dimensional product as claimed, except that Ederer does not teach first and second  
23 different liquefied materials, which is taught by Mozner. The Examiner cites col. 4,  
24 lines 5-7, col. 5, lines 44-52, and claim 1 of Mozner. The Examiner appears to  
25 contend that the suggestion or motivation to combine the teachings of Ederer with  
those of Mozner would have been to manufacture a three-dimensional product from  
various materials with a low investment cost.

The Examiner contends that claim 21 is unpatentable over Ederer because  
Ederer teaches a process of making a three-dimensional product as claimed, except  
that Ederer does not teach solidifying any viscous liquid remaining in the voids,  
which would have been obvious to one of ordinary skill in the art at the time the

1 invention was made since at least some small amount of support liquid remains in  
2 the voids, which would solidify along with the rest of the three-dimensional object.

3 The Applicants and the Examiner appear to be in agreement as to the  
4 applicable legal authority. The Applicants have previously provided specific citations  
5 to authority in support of their arguments and will thus not repeat those citations in  
6 making the following arguments.

7 **Not All Limitations of Claim 1 are Taught** – The Applicants respectfully  
8 disagree with the Examiner's contention that Ederer and Mozner, when combined,  
9 teach or suggest all the limitations of claim 1. Specifically, claim 1 requires the  
10 following limitation:

11 ejecting drops of first and second different liquefied materials in a  
12 pattern and allowing the drops to solidify to form a layer of a three-  
13 dimensional object, wherein the second liquefied material is deposited  
14 to form portions of the layers which define an external surface of the  
15 three-dimensional object.

16 However, contrary to the Examiner's assertion, Mozner does not teach the use of  
17 two different liquefied materials (i.e., a first material and a second material) to form  
18 the object. Rather, Mozner teaches the use of single material that may consist of  
19 two or more components such as a base material and a catalyst material.

20 A thorough search of Mozner reveals that Mozner never refers to the  
21 application of more than one material to form the object. Rather, throughout the  
22 specification, Mozner refers to application of "a material" and/or "a fluid" to form the  
23 object. For example, in the abstract Mozner states "[a] process...includes the step  
24 of applying a material." Mozner also states, "[t]he plot nozzle (14) is connected to a  
25 tube (20) which receives a fluid (22) from a container (24)." (Mozner Col. 6,  
lines 10-11.)

26 The Examiner cites col. 4, lines 5-7 of Mozner as evidence that Mozner  
27 teaches or suggests application of first and second different liquefied materials.  
28 However, Mozner does not actually teach application of first and second different  
29 materials. Rather, what Mozner teaches is application of a single material that can  
30 include two components. Specifically, at the aforementioned place cited by the  
31 Examiner, Mozner states, "...double cartridges are available in connection with two  
32 component materials."

1 Mozner goes on to provide examples of two component materials. For  
2 example, Mozner states, “[a] conventional dual hardenable film (Variolink II Base  
3 and Cat available from Ivoclar-Vivadent AG) was used ... [and] a mixing container  
4 was used which permitted the two components Variolink II Base and Variolink II Cat,  
5 to first be mixed in equal portions immediately before the nozzle outlet.” (Mozner,  
6 col. 7, line 60 through col. 8, line 3.) Thus, at most, Mozner teaches only the use of  
7 a single material having two components. This is not equivalent to the Applicants’  
8 limitation requiring application of first and second different liquefied materials.

9 Hypothetically, even if the prior art did teach the use of a first and second  
10 different liquefied materials, as is required by the Applicants’ claim 1, the prior art  
11 does not teach wherein the second liquefied material is deposited to form portions of  
12 the layers which define an external surface of the three-dimensional object, as is  
13 also required by claim 1. Moreover, the Examiner does not address this limitation.

14 Thus, the cited prior art references do not teach or suggest all the limitations  
15 of claim 1, as is required for obviousness.

16 **No Motivation to Combine Ederer with Mozner** – As the Applicants have  
17 previously noted in regard to suggestion or motivation to combine reference  
18 teachings, obviousness requires a logical reason apparent from positive, concrete  
19 evidence that justifies the combination of the references. The Applicants contend  
20 that the Examiner has not provided the requisite positive concrete evidence of a  
21 logical reason that justifies the combination of Ederer and Mozner.

22 As mentioned herein above, the Examiner concludes that it would have been  
23 obvious to one of ordinary skill in the art to combine the teachings of Ederer with  
24 those of Mozner in order to manufacture a three-dimensional product from various  
25 materials with a low investment cost. However, there is no evidence to support the  
Examiner’s conclusion. Specifically, there is no evidence that the combination of the  
teachings of Ederer and Mozner (or even that what was known to one of skill in the  
art at the time on the invention) would have been associated with an investment cost  
lower than the respective investment costs associated with each of the teachings of  
Ederer and Mozner individually.

Thus, there is no suggestion or motivation in the prior art to combine the  
reference teachings to result in what is claimed, as is required.

1 **Not All Limitations of Claim 21 are Taught** – The Applicants note that claim 21  
2 requires the following limitation:

3 removing the object from the viscous liquid in the vat and then  
4 solidifying the viscous liquid remaining in the voids between solidified  
5 drops of the material forming the object.

6 The Applicants agree with the Examiner's statement that Ederer does not  
7 teach solidifying any viscous liquid remaining in the voids. However, the Examiner  
8 does not provide any evidence that this limitation was known to those of ordinary skill  
9 in the art at the time the invention was made, as is required. Instead, the Examiner  
10 simply states that this limitation would have been obvious to one of ordinary skill in  
11 the art at the time the invention was made because some of the liquid remains in the  
12 voids and this remaining liquid solidifies along with the rest of the three-dimensional  
13 object. However, again, there is no evidence showing that it would have been more  
14 obvious to one of ordinary skill in the art to solidify the liquid remaining in the voids  
15 as opposed to allowing the liquid to drain away or otherwise removing the liquid from  
16 the voids. As is pointed out above, there must be a logical reason apparent from  
17 positive, concrete evidence that justifies the modification of the reference. The  
18 Examiner has not provided such requisite evidence.

19 Accordingly, the Applicants contend that the prior art does not teach or  
20 suggest all the limitations of claim 21, as is required.

21 **Ederer Teaches Away From What is Claimed** – As previously noted, prior art that  
22 teaches away is evidence of nonobviousness. A prior art reference may be  
23 considered to teach away when a person of ordinary skill, upon reading the  
24 reference, would be led in a direction divergent from the path that the Applicants  
25 took. (*In re Gurley*, 27 F.3d at 553, 31 USPQ 2d at 1131 (Fed. Cir. 1994).)

Ederer states, "... the supporting fluid is ... selected to remain in its liquid  
state throughout the production process ...." (Ederer, col. 2, lines 54-58, and col. 3,  
lines 10-13.) It is apparent that this statement by Ederer teaches away from  
solidifying the viscous liquid, as required by claim 21.

Ederer also states, "Preferably, a glycerin solution is used as supporting  
liquid ...." (Ederer, col. 6, lines 33-34.) The Applicants contend that glycerin solution  
is not capable of being practically solidified as contemplated by the Examiner. (An

1 85% solution of glycerine (as described by Ederer) has a freezing point of 12.4°F).  
2 (See <http://www.dow.com/glycerine/resources/table8.htm>.) Thus, at room  
3 temperature (i.e., about 65°F or above), the glycerin solution of Ederer would be a  
4 liquid.) Therefore, it is apparent that this statement by Ederer also teaches away  
5 from solidifying the viscous liquid, as required by claim 21.

6 Ederer additionally teaches that, "... dents in the surface of the layer produced  
7 during the last cycle are ... removed mechanically [by the leveling instrument] ...."  
8 (Ederer, col. 8, lines 1-5.) In other words, according to the teachings of Ederer, the  
9 surface of each top layer is smoothed, which prevents any voids from forming within  
10 the structure. Thus, according to this teaching of Ederer, solidifying the liquid  
11 remaining in the voids would be impossible because there are no voids formed in the  
12 structure. This is still further evidence that Ederer teaches away from the limitations  
13 required by claim 21.

14 Accordingly because Ederer teaches away, there is strong evidence of the  
15 nonobviousness of claim 21.

16 **Claims 2-17, 22-25 and 31-38** – Inasmuch as claims 2-17 depend from claim 1, it is  
17 therefore logical that each of claims 2-17 are also not obvious over (or anticipated  
18 by) the cited prior art for at least the reasons that claim 1 is not obvious, as set forth  
19 herein above. Similarly, inasmuch as claims 22-25 and 31-38 depend from claim 21,  
20 it is therefore logical that each of claims 22-25 and 31-38 are also not obvious over  
21 (or anticipated by) the cited prior art for at least the reasons that claim 21 is not  
22 obvious, as set forth herein above.

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**SUMMARY**

In view of the above arguments against the rejections of the pending claims, the Applicants respectfully request that all of the rejections be withdrawn and that all of the pending claims be allowed.

The Applicants believe this Response / Amendment constitutes a full and complete reply to the Office action mailed July 16, 2007.

If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (509) 534 5789.

Respectfully submitted,  
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